

Appl. No. 09/749,243
Response dated August 25, 2004
Reply to Office Action dated March 25, 2004

of a water purification system using reverse osmosis in Orange County, California (water factory number 21).- -

On page 17, after line 26, delete:

“Figure 21 represents selected data points, reduced to graphic form from the tests described in the Methods section.

Figure 22 is a representation of the pressure required to drive a flow of 3.2 gpm in a membrane which had been charged with IPE and then exposed to bolus of 500 ml of 5,000 ppm IPE.

Figure 23 is a graphic representation of the data from a membrane charged with IPE procesing 72 grain hardness feed water.

Figure 24 shows percent calcium rejection as a function of IPE feed.

a) PSRO Membrane Results

Figure 21 represents selected data points, reduced to graphic form from the tests described in the Methods section. As may be noted from the curve on feed water, the feed calcium concentration was 4 mg/l. The concentration fell to 3.33 mg/l just prior to the addition of IPE. This change was believed to be due to mixing within the large mix tank used. The conductivity rejection was 92% just after the membrane was regenerated with a 5% solution of sodium chloride. This high rejection rate persisted for about 27 minutes at a feed water flow of 2.25 gpm. The membrane then began to fail and the conductivity rejection dropped by 57% by 50 minutes. When IPE was added at 17.8 ppm, the rejection fraction returned to 83% at 80 minutes and maintained that fraction of rejection. Following regeneration of the membrane with the 5% NaCl solution the calcium rejection was 67%. When the membrane failed, the calcium rejection fell to 23%. When the IPE was added, the calcium rejection returned to 85%. As the membrane failed, the recovery dropped but returned to the original recovery by 90 minutes. Table 1 presents selected data points to demonstrate membrane failure and on-line regeneration and protection by IPE. Table 2 is a comprehensive listing of all data points from the experiment.

b) TFC Membrane Results

Figure 22 is a representation of the pressure required to drive a flow of 3.2 gpm in a

membrane which had been charged with IPE and then exposed to bolus of 500 ml of 5,000 ppm IPE. The feed water was unsoftened and contained 72 grains of hardness (1231 mg/l Ca). Figure 23 is a graphic representation of the data from the same membrane charged with IPE processing the same 72 grain hardness feed water. When a bolus of IPE was exposed to the membrane, the mg/l of Ca dropped from 6.6 to 2.2. Therefore, as noted in Figure 24, the percent calcium rejection increased from about 99.5 to approximately 99.8.” and insert

- - Figure 20 represents selected data points, reduced to graphic form from the tests described in the Methods section.

Figure 21 is a representation of the pressure required to drive a flow of 3.2 gpm in a membrane which had been charged with IPE and then exposed to bolus of 500 ml of 5,000 ppm IPE.

Figure 22 is a graphic representation of the data from a membrane charged with IPE processing 72 grain hardness feed water.

Figure 23 shows percent calcium rejection as a function of IPE feed.

a) PSRO Membrane Results

Figure 20 represents selected data points, reduced to graphic form from the tests described in the Methods section. As may be noted from the curve on feed water, the feed calcium concentration was 4 mg/l. The concentration fell to 3.33 mg/l just prior to the addition of IPE. This change was believed to be due to mixing within the large mix tank used. The conductivity rejection was 92% just after the membrane was regenerated with a 5% solution of sodium chloride. This high rejection rate persisted for about 27 minutes at a feed water flow of 2.25 gpm. The membrane then began to fail and the conductivity rejection dropped by 57% by 50 minutes. When IPE was added at 17.8 ppm, the rejection fraction returned to 83% at 80 minutes and maintained that fraction of rejection. Following regeneration of the membrane with the 5% NaCl solution the calcium rejection was 67%. When the membrane failed, the calcium rejection fell to 23%. When the IPE was added, the calcium rejection returned to 85%. As the membrane failed, the recovery dropped but returned to the original recovery by 90 minutes. Table 1 presents selected data points to demonstrate membrane failure and on-line regeneration and protection by IPE. Table 2 is a comprehensive listing

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b) TFC Membrane Results

Figure 21 is a representation of the pressure required to drive a flow of 3.2 gpm in a membrane which had been changed with IPE and then exposed to bolus of 500 ml of 5,000 ppm IPE. The feed water was unsoftened and contained 72 grains of hardness (1231 mg/l Ca). Figure 22 is a graphic representation of the data from the same membrane charged with IPE processing the same 72 grain hardness feed water. When a bolus of IPE was exposed to the membrane, the mg/l of Ca dropped from 6.6 to 2.2. Therefore, as noted in Figure 23, the percent calcium rejection increased from about 99.5 to approximately 99.8. - -